EFFECT OF MOBILSATION WITH MOVEMENT (MWM) USING BELT VERSUS THERAPEUTIC ECCENTRIC EXERCISE (TEE) TRAINING FOR REDUCING PAIN AND IMPROVING FUNCTIONAL ACTIVITY IN CHRONIC LATERAL EPICONDYLITIS PATIENTS.

- A COMPARATIVE STUDY

Dissertation submitted to the Tamilnadu Dr. M.G.R. Medical University towards partial fulfillment of the requirements of **MASTER OF PHYSIOTHERAPY (Advanced PT in ORTHOPAEDICS) DEGREE PROGRAMME.**

KMCH COLLEGE OF PHYSIOTHERAPY

(A unit of Kovai Medical Centre Research and Educational Trust)

Post Box No. 3209, Avanashi Road,

Coimbatore – 641 014.

2010-2012

CERTIFICATE

This is to certify that research work entitled **"TO COMPARE THE EFFECT OF MOBILSATION WITH MOVEMENT (MWM) USING BELT VERSUS THERAPEUTIC ECCENTRIC EXERCISE (TEE) TRAINING FOR REDUCING PAIN AND IMPROVING FUNCTIONAL ACTIVITY IN CHRONIC LATERAL EPICONDYLITIS PATIENTS''** was carried out by the candidate bearing the Register No:27101603, KMCH College of Physiotherapy towards partial fulfillment of the requirements of the **Master of Physiotherapy (*Advanced PT in Orthopaedics*)** of the Tamil Nadu Dr. M.G.R. Medical University, Chennai-32.

PROJECT GUIDE

Mr. K. SHAYAM SUNDAR, M.P.T,
Professor,
KMCH College of Physiotherapy
Coimbatore-641 014.

PRINCIPAL

Dr. EDMUND M D'COUTO,
MBBS.Dip.Phy.Med& Rehab
KMCH College of Physiotherapy
Coimbatore-641 014.

INTERNAL EXAMINER

EXTERNAL EXAMINER

Project Evaluated on:

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ABSTRACT

ABSTRACT

Objectives

To study the effectiveness of Mobilisation with Movement (MWM) using belt and Therapeutic Eccentric Exercise (TEE) in reducing pain and improving functional activity in chronic lateral epicondylitis patients.

Study Design

Pre test and Post test experimental study design.

Study setting

Department of physical medicine and rehabilitation,

KMCH Hospital Coimbatore-14,

LIFE SPRING SPORTS club, Coimbatore-28.

Methodology

Thirty patients with chronic lateral epicondylitis were randomized into two groups by purposive sampling technique. Group A receives Mobilisation with Movement (MWM) using belt and Group B receives Therapeutic Eccentric Exercise (TEE). Outcome measures are visual analogue scale (VAS), Patient Rated Elbow Evaluation Questionnaire (PREEQ) were used before and after intervention.

Results

Paired‘t’ test and independent ‘t’ test were done and it was found that there was a significant difference between Mobilisation with Movement (MWM) using belt group and Therapeutic Eccentric Exercise (TEE) group in reducing pain and improving the functional activity. There is statically significant difference found between Mobilisation with Movement (MWM) using belt group and Therapeutic Eccentric Exercise (TEE) group in reducing pain and improving the functional activity.

Conclusion

This study concludes that both Movement with Mobilisation (MWM) Using Belt and Therapeutic eccentric exercise Technique is equally effective for reducing pain, but Therapeutic Eccentric Exercise (TEE) found to be very effective in improving the functional activity.

Key words: chronic lateral epicondylitis, Mobilisation with Movement (MWM) using belt, Therapeutic Eccentric Exercise (TEE).

INTRODUCTION

1. INTRODUCTION

Lateral epicondylitis is commonly known as Tennis elbow. It was described in 1873 by **RUNGE**. It occurs in both males and females due to their day to day activities. It is commonly seen from third decade to fifth decade[1].

Lateral epicondylitis usually involves the origin of Extensor Carpi Radialis Brevis (ECRB) muscle and less frequently the Extensor Carpi Radialis Longus (ECRL) and anterior portion of Extensor Communis (EC) [2].

Lateral epicondylitis is commonly seen among tennis players and less commonly among electricians, carpenters and plumbers. Almost 45% of the tennis players are commonly affected because they do forceful pronation and supination movements in a faulty way[4].

Chronic lateral epicondylitis occurs due to low grade repetitive stresses placed upon the tendon over a prolonged period of time. Involved tendon shows signs of collagen degeneration because of repeated stresses[3].

Mobilisation with Movement (MWM) using belt is the concurrent application of sustained accessory glide given by the therapist while the patient is asked to do an end range active physiological movement. The techniques are always applied in a pain-free direction. Mobilisation with Movement (MWM) using belt to corrects positional fault by joint tracking[4].

Therapeutic Eccentric Exercise (TEE) effectively “lengthens” the muscle-tendon complex resulting in structural remodelling of the tendon with hypertrophy and increased tensile strength of the tendon. It may also provide neuromuscular benefits through central adaptation of agonist and antagonist muscles[28].

Physiotherapy management for patient with lateral epicondylitis includes Cryotherapy, counterforce splint, extra corporal shock wave therapy, ultrasound, iontophoresis, phonophoresis and transcutaneous electrical nerve stimulation and cross friction massage.

BACK GROUND

2. BACKGROUND OF THE STUDY

Chronic Lateral epicondylitis to the extensor tendons at the elbow result from repeated micro trauma to the tendon leading to disruption and degeneration of the tendon internal structure (tendinous) [1]. It appears to be a degenerative condition in which the tendon has failed to heal properly after repetitive micro trauma injury[2].

In majority of patients, the pain is on and off until healing is completes and once the healing takes place the pain subsides permanently. In others, pain gets worse because the granulation tissue, does not progress quickly to mature form, and so healing fails to take place.

Mobilisation with Movement (MWM) using belt is a manual therapy intervention commonly used in the management of patients with chronic lateral epicondylitis specific form, Mobilisation with Movement (MWM) using belt - a lateral glide at the elbow-has been found to have rapid pain-relieving effects and increased grip strength in patients with lateral epicondylitis[3].

Therapeutic Eccentric Exercise (TEE) used here involves holding a FlexBar and is found to be effective in chronic lateral epicondylitis. This home-based treatment is inexpensive compared to more expensive isokinetic devices[3][5].

Hence, this study investigates the effect of Mobilisation with Movement (MWM) using belt and Therapeutic eccentric exercise (TEE) in chronic lateral epicondylitis patients.

NEED FOR STUDY

3. NEED FOR THE STUDY

In spite of the various physiotherapy treatments available for lateral epicondylitis, no treatment is proven to be effective because all the physiotherapy modalities fail to improve the pain and functional activity.

So this study would focus on the effects of Mobilisation with Movement (MWM) using belt and Therapeutic Eccentric Exercise (TEE) in reducing pain and improving functional activity in patients with chronic lateral epicondylitis.

REVIEW OF LITERATURE

4. REVIEW OF LITERATURE

4.1. DEFINITION OF LATERAL EPICONDYLITIS

Mark Sarfan

He defines that, lateral epicondylitis is a chronic condition of the common extensor muscles of wrist, primarily the ECRB, due to overuse from both intensity and duration[1].

Robert P.Nirschl

He states that, tennis elbow primarily involves the origin of the Extensor Carpi Radialis Brevis (ERCB), occasionally the anterior edges of the Extensor Communis (EC) and the underside of the Extensor Carpi Radialis Longus (ERCL), and rarely the origin of the extensor Carpi ulnaris (ERU) [2].

4.2. INCIDENCE OF LATERAL EPICONDYLITIS

Ernst and Katarinal

Tennis elbow mostly occurs in middle age with incidence of the condition peaking between the ages of 35 and 54 and with duration of an average episode of between 6 months and 2 years[2].

Nootboom et al

Out of the 35 % - 64% of diagnosed musculoskeletal problems, among work related activities, 8% of them have been found to have tennis elbow.

Verhaar et al

Tennis elbow affects the dominant arm most commonly with epidemiological studies showing a prevalence of 1% in men and 4% in women[29].

4.3. BIOMECHANICAL FACTORS OF LATERAL EPICONDYLITIS

Bender (1994)

There are many factors that can be lead to be lateral epicondylitis

- An overuse injury wrist extension can occur if Extensor Carpi Radialis Brevis (ECRB) takes on the sole of flexing the elbow ahead of biceps.
- If the amount of external rotation in shoulder is restricted, it can be lead to extra strain being placed on the elbow.
- A lack of mobility in the back
- Playing surfaces: Harder ones mean increased forces.

Robert. P.Nirschl, MD., MS; Barry.S.Kraushaar M.D (1996)

He states that, muscles overload ,combined with the disadvantage leverage system caused by the sloping system lateral epicondyle, creates a fulcrum effect around the prominent radial head and thus increased tension of the soft tissues in that area, particularly when the forearm is working in the hyperpronated position.

Inadequate forearm extensor power and endurance to withstand normal, forceful, repetitive movements placed against the forearm flexors and extreme moments of force or repetitions, despite reasonable muscle power, endurance and flexibility are other causes of tennis elbow[16].

Hang Y et al

Tennis players develop tennis elbow due to the following reasons: heavier, stiffer and tightly strong racquets, metal racquets, incorrect grips, inexperienced players and bad back hand technique.

Andrews and Harelson

He stated that, point of racquet to ball contact that the extensor muscles must contact to stabilize the wrist and hold the racquet. This results in repetitive muscle contraction yielding chronic overload[13].

4.4. PATHOLOGY OF LATERAL EPICONDYLITIS

Glodie (1964)

Repeated stress over the wrist extensor especially to the Extensor Carpi Radialis Brevis (ERCB) because of less tensile stress. Microtrauma with subsequent granulation tissue formation on the underside of the random unit the tenoperiosteal junction.

The granulation tissue formed appears to contain large number of free nerve endings, hence the pain of the condition. The major problem is that the granulation tissue does not progress quickly to mature and so the healing fails to take place almost a type a tendinous ‘’non-union’’.

Wadsworth (1987)

He says that, tennis elbow is characterized by superficial or deep macroscopic and microscopic tears at the tendinous origin of the ECRB, at the periosteum of the lateral epicondyle. He indicated that microalvulsion fractures may be seen, as well as round cell infiltration, scattered foci of fine calcification and scar tissue with marginal areas of cytic and fibrinoid degeneration.

Steiner (1976)

He commenced on the poor blood supply to the lateral epicondyle and Sensory fibres containing substance-P&CGRP (calcitonine gene related peptide) attached to the periosteum of the epicondyle are relatively vascular compared to the origin of ECRB muscle. Damage to muscle heals rapidly when compared with tendon. Since nutrition becomes even further impaired with age-related degenerative changes, age is described as a dominant factors.

Nirschl RP (1973)

Repetitive micro traumatic injury is believed injury to result in micro tears of muscular origin. Focal degeneration and healing with vascular and fibroblastic proliferation suggest that is a degenerative process[17].

Nirschl defined the following progressive stages,

Stage 1 - inflammatory changes that are reversible.

Stage 2 - non-reversible pathologic changes to origin of the ECRB muscle.

Stage 3 - Rupture of ECRB muscle origin.

Stage 4 - secondary changes such as fibrosis or calcification[12].

4.5. SIGNS AND SYMPTOMS OF LATERAL EPICONDYLITIS

Bernard F.Morrey

He stated that, presence of localized pain and tenderness, specifically at the origin of the ECRB just anterior and distal to the lateral epicondyle. There may also be pain and palpable tenderness in the extensor muscle belly.

Louis Solomon

The onset of lateral elbow pain is gradual, often after a period of unaccustomed activity involving forceful gripping and wrist extension. It is aggravated by movements like shaking hands or lifting with forearm pronated[1].

4.6. TRATMENT EVALUATION OF LATERAL EPICONDYLITIS

Tuomo T. Pienimaki et al

A comparison of pain, disability and function was done using a cross sectional case control study. It shows strong association existing between pain, grip strength, and manual tests in the treatment evaluation of tennis elbow[21].

Smidt N et al

This study was done to evaluate the interobserver reproducibility of the assessment of severity of complaints, grip strength and pressure pain threshold in patients with lateral epicondylitis .The interobserver reliability of complaints and grip strength was excellent, whereas the pressure pain threshold showed unsatisfactory reliability. Grip strength and overall assessment of the severity of complaints are useful and reliable measures for the assessment of lateral epicondylitis[25].

4.6.1. VISUAL ANALOGUE SCALE

Kane RL et al

Individual variations in pain regains were found to be independent of respondent age and gender, but were correlated with experience of the event behaviour and with self-reported health status. So, it was concluded that it is possible to standardize VAS pain ratings to compare pain between different populations[32].

Williamson A Hoggart B

A review of 3 commonly used rating scales was done: Visual Rating Scale, Verbal Rating Scale, and Numerical Scale. It concludes that all 3 pain-scales are valid, reliable and appropriate for use in clinical practice.

4.6.2. PATIENT RATED ELBOW EVALUATION QUESTIONNAIRE (PREEQ):

Overend and Associateds

This study was done to determine the reliability of a questionnaire designed to assess forearm pain and function in patients with lateral epicondylitis. It concludes that PREEQ can provide a simple, quick and reliable estimate of arm pain and function in patients with lateral epicondylitis[18].

Newcomer et al

This study examined the sensitivity, reliability and concurrent validity of the Patient Rated Forearm Evaluation Questionnaire. It states that the PREEQ is reliable, reproducible and sensitive for assessment of lateral epicondylitis[15].

MacDremid JC

This study evaluated the reliability and validity of 4 patient questionnaires with elbow pathology. They are: American shoulder and hand (DASH) Questionnaire and short Form- 36. Four constructs on the relationship expect between outcome measures determined prior to data collection were observed as anticipated, supporting the validity of the 4 outcome questionnaires.

4.7. SPECIAL TEST FOR LATERAL EPICONDYLITIS

Cozen's Test

The patient's elbow is stabilized by the examiner's thumb, which rests on the patient's lateral epicondyle. The patient is then asked to actively make a fist, pronate the forearm, and radially deviate and extend the wrist while the examiner resists the motion. A sudden severe pain in the area of the lateral epicondyle of the humerus is a positive sign. The epicondyle may be palpated to indicate the origin of the pain[4].

Mill's Test

While palpating the lateral epicondyle, the examiner passively pronates the patient's forearm, flexes the wrist fully, and extends the elbow .Pain over the lateral epicondyle of the humerus indicates a positive test[4].

4.8. TREATMENT METHODS

4.8.1. MOBILISATION WITH MOVEMENT (MWM) USING BELT

Mulligan RD (1999)

In this study patient with lateral epicondylitis, suggested that Mobilisation with Movement (MWM) of lateral glide and strong resisted grip was found to be more effective in reducing pain and improvement in function without symptoms[4].

Paungmali A et al, (2003)

In this study done 21 participants with lateral epicondylitis, a placebo, control repeated measures, was conducted to evaluate whether Mobilisation with Movement (MWM) at the elbow produced concurrent hypoalgesia effect[20].

Abbott JH et al, (2001)

This study done 25 participants with lateral epicondylitis reported that Mobilisation with Movement (MWM) is a promising intervention modality for the treatment of patients with lateral epicondylitis.

Vicenzino et al, (1998, 2001)

He found that the sustained lateral glide with pain free grip treatment technique of the elbow exerts a powerful effect on pain free grip strength and substantially less of an effect on pressure pain threshold.

Mc Leans, et al (2002)

He conducted a pilot study and confirmed that the level of applied force of Mobilisation with Movement (MWM) appear to be critical for pain relief in patients with lateral epicondylitis.

Vicenzino B (2003)

In this study confirmed that Mobilisation with Movement (MWM) is the clinically effective management for lateral epicondylitis and serves as a model for other similar musculoskeletal conditions.

4.8.2. THERPEUTIC ECCENTRIC EXERCISE (TEE)

Stanish et al (1986)

He found that, eccentric exercises effectively lengthened the muscle-tendon complex resulting in structural remodelling of the tendon with hypertrophy and increase in tensile strength of the tendon[24].

Tyler et al (2009)

He concluded that, the FlexBar exercises reduced 81% of pain compared with control group. DASH score improved 76% in the flexBar group compared to only 13% in the control group[28].

Woodley BL, Newsham-west RJ, Baxter GD.

While the efficacy of isolated eccentric training for the treatment of tendopathies in various joints has been clearly established, the additional benefit of this treatment is that it can be performed home program and does involve continued medical supervision[34].

AIM AND OBJECTIVES

5. AIM AND OBJECTIVES

5.1. AIM

To study the effectiveness of Mobilisation with Movement (MWM) using belt and Therapeutic Eccentric Exercise (TEE) for reducing pain and improving functional activity in chronic lateral epicondylitis patients.

5.2. OBJECTIVES

- To find out the effect of Mobilisation with Movement (MWM) using belt for reducing pain and improving functional activity in chronic lateral epicondylitis patients.
- To find out the effect of Therapeutic Eccentric Exercise (TEE) for reducing pain and improving functional activity in chronic lateral epicondylitis patients.
- To compare the effect of Mobilisation with Movement (MWM) using belt and Therapeutic Eccentric Exercise (TEE) for reducing pain and improving functional activity in chronic lateral epicondylitis patients.
- To analyse the possibility of providing the Therapeutic Eccentric Exercise (TEE) in regular Physiotherapy management.

MATERIALS AND METHODOLOGY

6. MATERIALS AND METHODOLOGY:

6.1. STUDY DESIGN:

Pre test and Post test experimental study design.

6.2. SAMPLING TECHNIQUE:

Purposive sampling technique.

6.3. STUDY POPULATION:

Thirty subjects

Group A-15 Subjects: Mobilisation with Movement (MWM) using belt

Group B-15 Subjects: Therapeutic Eccentric Exercise (TEE)

6.4. STUDY SETTING:

Department of physical medicine and rehabilitation,

KMCH Hospital Coimbatore-14,

LIFE SPRING SPORTS club, Coimbatore-28.

6.5. STUDY DURATION:

Four months

6.6. INCLUSION CRITERIA:

- Age group between Twenty - fifty five years.
- Both males and females.
- Lateral epicondyle pain present, more than six weeks
- Positive Cozen’s test and mills test
- Subjects who agrees for not taking any medications during exercise

6.7. EXCLUSION CRITERIA:

- Radial tunnel syndrome
- Brachial neuralgia
- Radio humeral bursitis
- Myositis ossificans at elbow
- Joint effusion in the affected elbow
- Osteoarthritis of elbow
- Associated injuries to the affected elbow
- Generalized hypermobility
- Haemophilia
- Metabolic joint disorders
- Neurological disorders
- Cervical radiculopathy
- Posterior interroseous nerve syndrome.

6.8. OUTCOME MEASURES:

6.8.1. VISUAL ANALOGUE SCALE

6.8.2. PATIENT RATED ELBOW EVALUATION QUESTIONARRIE (PREEQ)

6.9. NULL HYPOTHESIS:

- There is no significant difference in reducing pain with Mobilisation with Movement (MWM) using belt in patients with chronic lateral epicondylitis.
- There is no significant difference in reducing pain with Therapeutic Eccentric Exercise (TEE) in patients with chronic lateral epicondylitis.
- There is no significant difference in improving functional activity with Mobilisation with Movement (MWM) in patients with chronic lateral epicondylitis
- There is no significant difference in improving functional activity with Therapeutic Eccentric Exercise (TEE) in patients with chronic lateral epicondylitis.

- There is no significant difference existing between Mobilisation with Movement (MWM) using belt and Therapeutic Eccentric Exercise (TEE) in reducing pain among patients with chronic lateral epicondylitis.
- There is no significant difference existing between Mobilisation with Movement (MWM) using belt and Therapeutic Eccentric Exercise (TEE) in improving functional activity among patients with chronic lateral epicondylitis.

6.10. ALTERNATIVE HYPOTHESIS:

- There is significant difference in reducing pain with Mobilisation with Movement (MWM) using belt in patients with chronic lateral epicondylitis.
- There is significant difference in reducing pain with Therapeutic Eccentric Exercise (TEE) in patients with chronic lateral epicondylitis.
- There is significant difference in improving functional activity with Mobilisation with Movement (MWM) using belt in patients with chronic lateral epicondylitis
- There is significant difference in improving functional activity with Therapeutic Eccentric Exercise (TEE) in patients with lateral epicondylitis.
- There is significant difference existing between Mobilisation with Movement (MWM) using belt and Therapeutic Eccentric Exercise (TEE) in reducing pain among patients with chronic lateral epicondylitis.
- There is significant difference existing between Mobilisation with Movement (MWM) using belt and Therapeutic Eccentric Exercise (TEE) in improving functional activity among patients with chronic lateral epicondylitis.

6.11. STUDY METHOD:

GROUPA: MOBILISATION WITH MOVEMENT (MWM) USING BELT

Patient position:

Patient supine lying position with upper limb fully supported on treatment table.

Therapist position:

Therapist in walk stands position, adjacent to the affected elbow facing across the body of the patient.

TECHNIQUE:

PROCEDURE:

Therapist right hand stabilizes distal humerus and the left hand maintains the forearm pronation. The therapist is in a walk stand position facing across the patient and towards the patient's feet in such a position that the belt is over the therapists right shoulder and the other end is directly winding over the patients elbow .The treatment belt force is almost vertically up from the floor such that a small knee bend and extension by the therapist exerts the desired treatment force to the elbow

Repetition: Ten, Session: once in a day, Duration: Six weeks

GROUP B: THERAPEUTIC ECCENTRIC EXERCISE (TEE):

INSTRUCTION TO THE PATIENT:

A. Hold FlexBar in involved (right) hand with maximum wrist extension.

B. Grab other end of FlexBar with uninvolved (left) hand.

C. Twist FlexBar with non-involved wrist while holding the involved wrist in extension.

D. Bring arms front of the body with elbows in extension while maintaining twist in FlexBar by holding the non-involved wrist in full flexion and the involved wrist in full extension.

E. Slowly allow FlexBar to ‘untwist’ by allowing involved wrist to move into flexion (i.e., eccentric contraction of the involved wrist extensors)

THERAPEUTIC ECCENTRIC EXERCISE (TEE)

A

B

C

D

E

Repetition : Fifteen

Session : Three set / day

Duration : Four second

Rest : Thirty second

6.12. STATISTICAL ANALYSIS:

Pretest and post test values of the study was collected and was assessed for variation in improvement and their results was analyses using independent ‘t’ test (between groups) and paired ‘t’ test (within groups).

INDEPENDENT `t’ TEST (between groups)

$$t = \frac{\overline{X1} - \overline{X2}}{S} \sqrt{\frac{n_1 n_2}{(n_1 + n_2)}}$$

Where,

$$S = \sqrt{\frac{\sum d_1^2 + \sum d_2^2}{n_1 + n_2 - 2}}$$

PAIRED `t’ TEST (within groups)

$$t = \frac{\bar{d}\sqrt{n}}{S}$$ Where,

$$\mathbf{S} = \sqrt{\frac{\sum \boldsymbol{d^2} - [\bar{\boldsymbol{d}}]^2 \times \boldsymbol{n}}{\boldsymbol{n-1}}}$$

S=combined standard deviation

d_1&d_2 =difference between initial & final readings in group A &group B respectively.

n_1&n_2=number of patients in group A & group B respectively.

$\overline{X_1}$&$\overline{X_2}$ =Mean of group A & group B respectively.

Level of significance: 5%.

DATA PRESENTATION

7. DATA PRESENTATION

7.1. TABULATION PRESENTATION

A) VISUAL ANALOGUE SCALE

PAIRED‘t’ TEST - GROUP-A

Mean	Pre-Test	Post-Test
	66.6667	43.3333
‘t’ value	14.048	
‘p’ Value &significance	P<0.05 it is significant	

Table: 1

PAIRED‘t’ TEST- GROUP-B

Mean	Pre-Test	Post-Test
	64.8667	42.7333
‘t’ value	23.663	
‘p’ value & Significance	P<0.05 it is significant	

Table: 2

B) PREEQ SCORES

PAIRED‘t’ TEST- GROUP-A

Mean	Pre-Test	Post-Test
	63.6667	43.4
‘t’ value	19.161	
‘p’ value & Significance	P<0.05 it is significant	

Table: 3

PAIRED‘t’ TEST- GROUP-B

Mean	Pre-Test	Post-Test
	62.8	36.4667
‘t’ value	22.512	
‘p’ value & Significance	P<0.05 it is significant	

Table: 4

INDEPENDENT‘t’ TEST

A) VISUAL ANALOGUE SCALE

	Pre-Test		Post- Test	
Mean	Group A	Group B	Group A	Group B
	66.6667	64.8667	43.3333	42.7333
‘t’ Value	1.456		0.334	
‘p’ value & Significance	P<0.05 it is significant		P<0.05 it is significant	

Table: 5

B) PREEQ SCORES

	Pre-Test		Post- Test	
Mean	Group A	Group B	Group A	Group B
	63.6667	62.8	43.4	36.4667
‘t’ Value	0.504		4.524	
‘p’ value & Significance	P<0.05 it is significant		P<0.05 it is not significant	

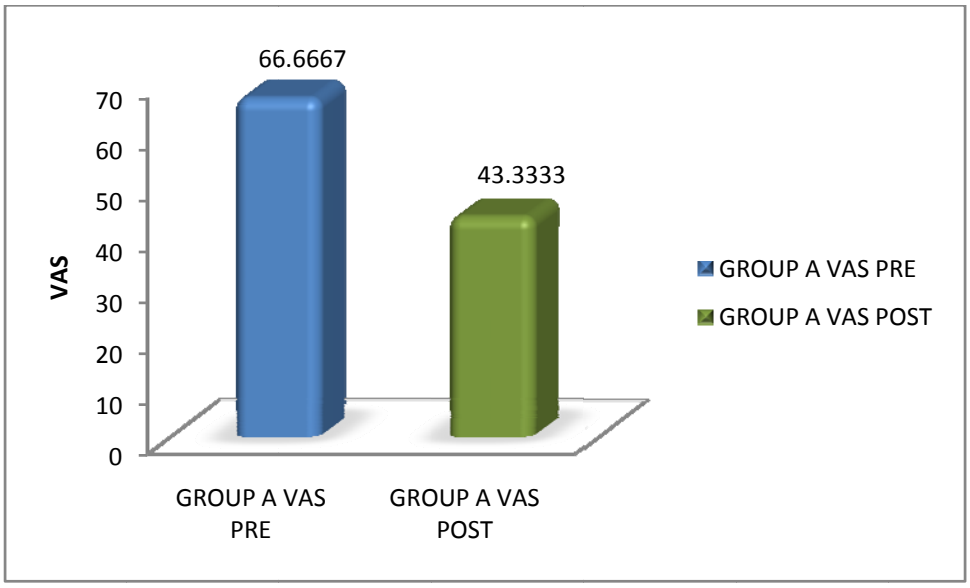
Table: 6

GRAPHICAL REPRESENTATION

8. GRAPHICAL REPRESENTATION

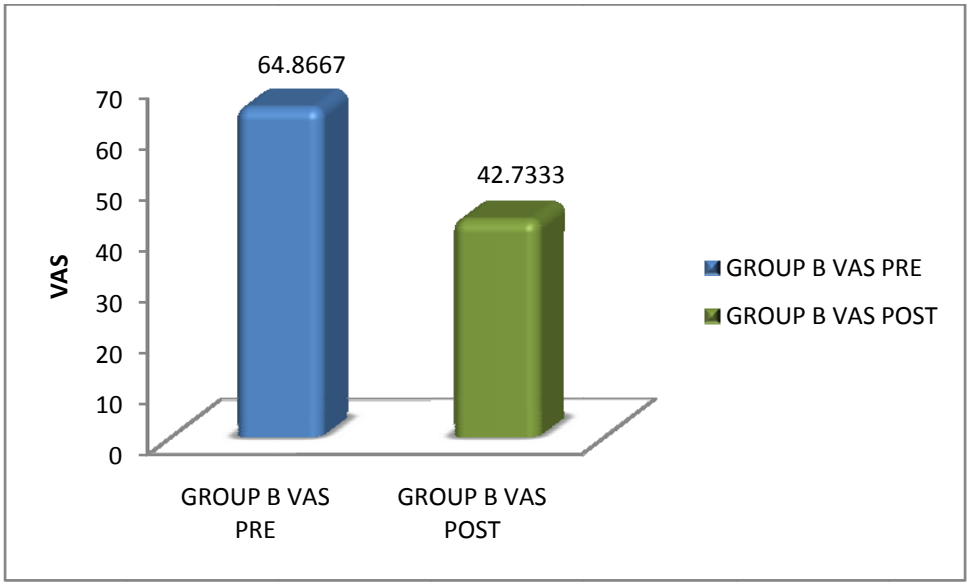
A) VISUAL ALALOGUE SCALE

PAIRED t TEST – GROUP A



Graph: 1

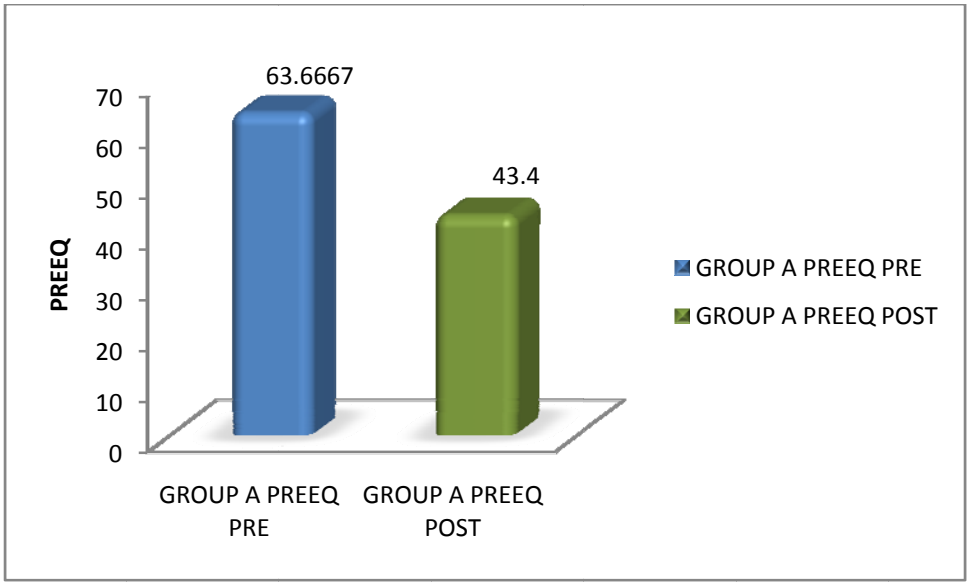
PAIRED t TEST – GROUP B



Graph: 2

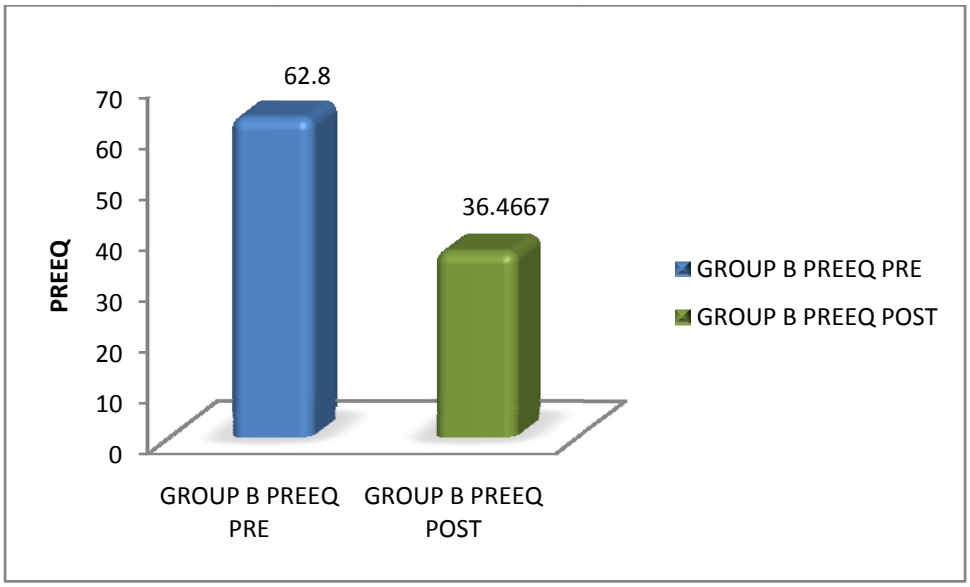
B) PREEQ SCORE

PAIRED‘t’ TEST – GROUP A



Group: 3

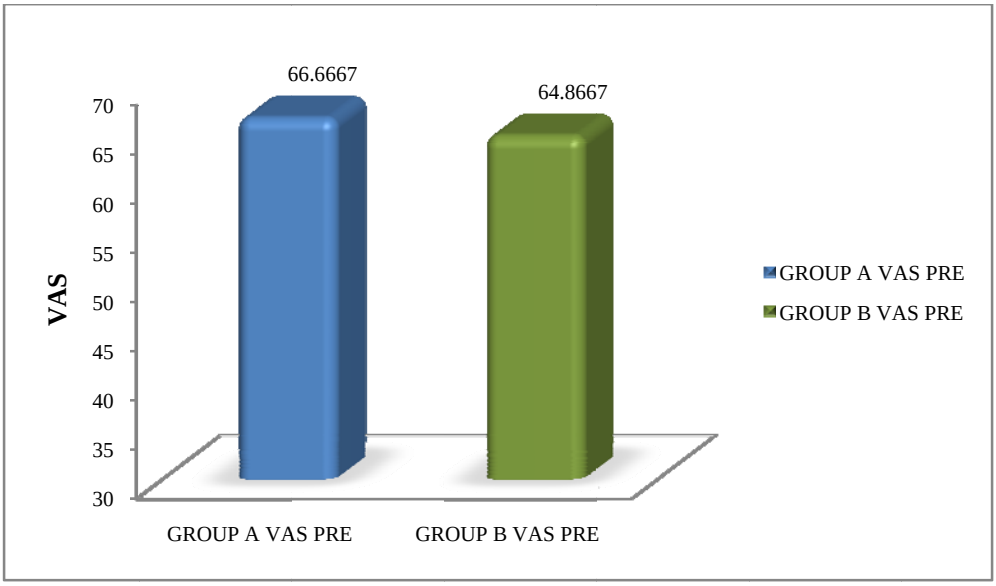
PAIRED t TEST – GROUP B



Graph: 4

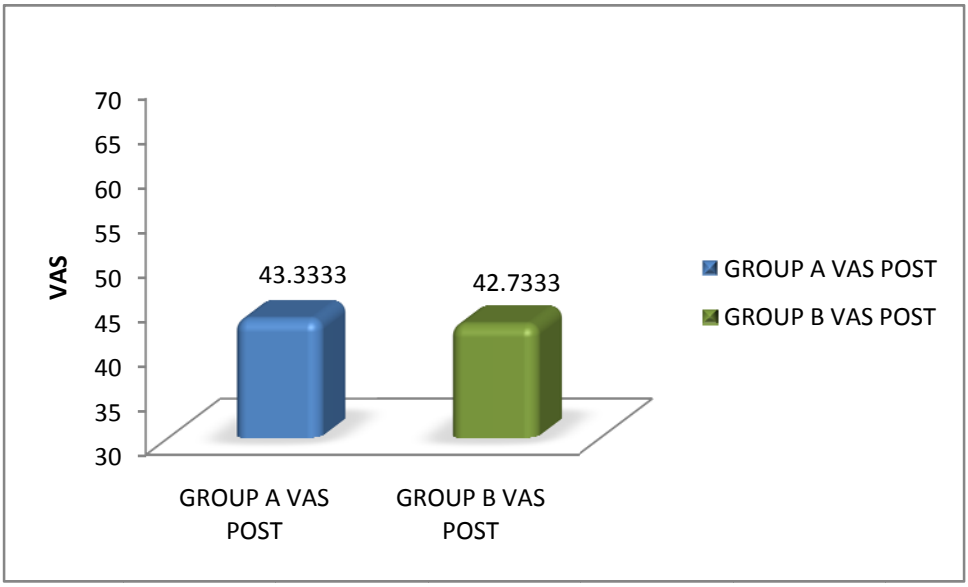
VISUAL ALALOGUE SCALE

INDEPENDENT‘t’ TEST – PRE TEST



Group: 5

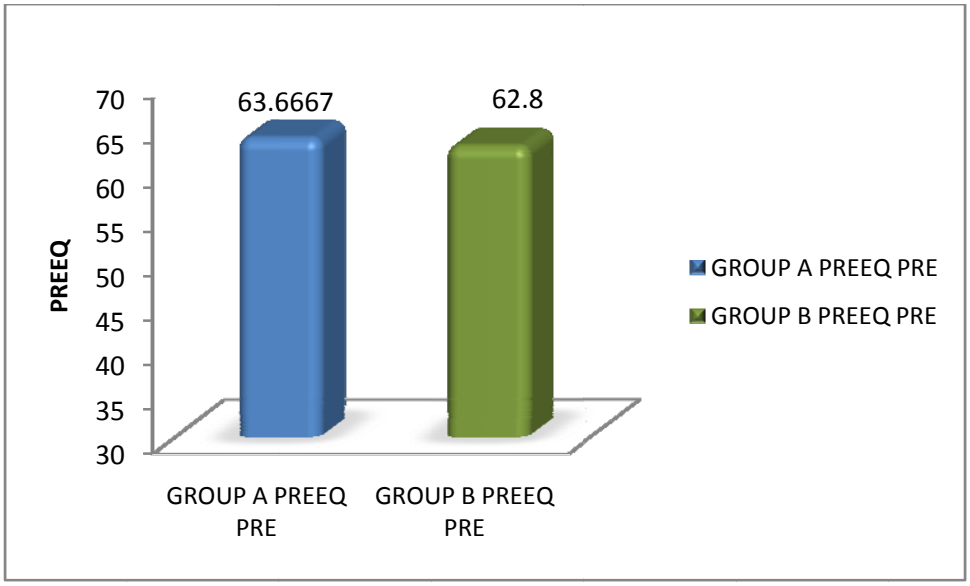
INDEPENDENT t TEST – POST TEST



Graph: 6

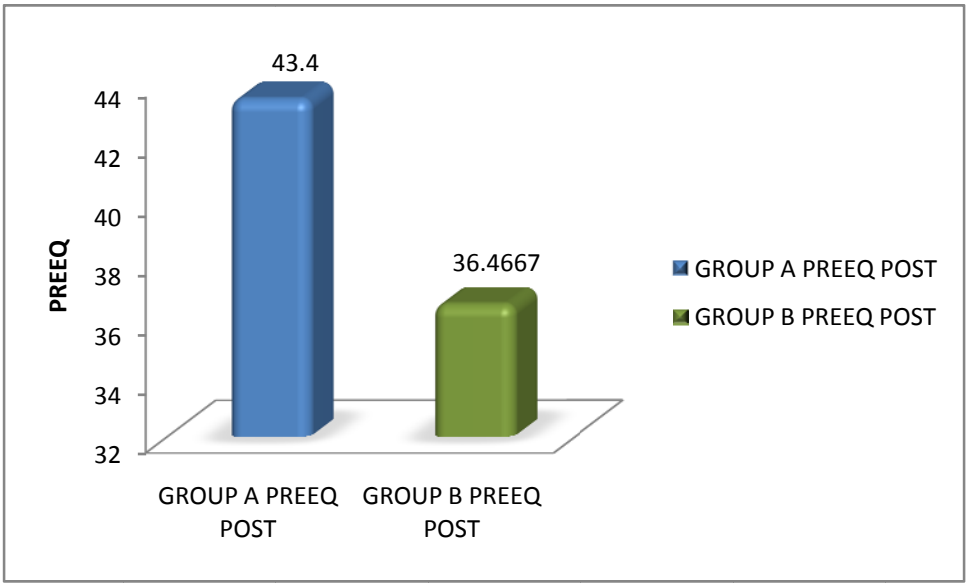
B) PREEQ

INDEPENDENT t TEST – PRE TEST



Graph: 7

INDEPENDENT t TEST – POST TEST



Graph: 8

DATA ANALYSIS AND INTERPRETATION

9. DATA ANALYSIS AND RESULTS

A) VISUAL ANALOGUE SCALE

PAIRED‘T’ TEST

For fourteen degree of freedom and 5% level of significance, the table‘t’ value is 2.145 and calculated ‘t’ value is Group A (14.048)and Group B(23.663) .Since the calculated ‘t’ value is greater than the table ‘t’ value the null hypothesis rejected. This shows that is significant reduction of pain in both the groups.

INDEPENDENT‘T’ TEST

For twenty eight degree of freedom and 5% level of significance, the table ‘t’ value is 2.048 and calculated ‘t’ value is Group A (1.456)and Group B(0.334) .Since the calculated ‘t’ value is lesser than the table ‘t’ value the null hypothesis accepted. This shows that is significant reduction of pain in both the groups.

Thereby, statistical analysis revealed that Therapeutic Eccentric Exercise (TEE) has been effectively reducing the pain when compared to Mobilisation with Movement (MWM) using belt.

B) PATIENT RATED ELBOW EVALUATION QUESTIONNAIRE (PREEQ)

PAIRED‘T’ TEST

For fourteen degree of freedom and 5% level of significance, the table‘t’ value is 2.145 and calculated ‘t’ value in Group A(19.161) and Group B(22.512) .Since the calculated ‘t’ value is greater than the table ‘t’ value the null hypothesis is rejected. This shows that there is significant improvement of functional activities in both the groups.

INDEPENDENT‘T’ TEST

For twenty eight degree of freedom and 5% level of significance, the table ‘t’ value is 2.048 and calculated ‘t’ value in Group A(0.504) and Group B(4.524) .Since the calculated ‘t’ value is greater than the table ‘t’ value the null hypothesis is rejected. This shows that there is significant improvement of functional activities in therapeutic eccentric exercise group only.

Thereby, statistical analysis revealed that Therapeutic Eccentric Exercise (TEE) has effectively improves the functional activity when compared to Mobilisation with Movement (MWM) using belt.

DISCUSSION

10. DISCUSSION

Lateral epicondylitis, being a common clinical problem, which can be effectively managed by physiotherapy. The effects of Mobilisation with Movement (MWM) using belt and Therapeutic Eccentric Exercise (TEE) have compared on the basis of pain and Patient Rated Elbow Evaluation Questionnaire .The baseline characteristics of both the groups were similar in all the 2 groups.

Lateral epicondylitis is a work related or sports related disorder due to microscopic tears in the Extensor Carpi Radialis Brevis (ECRB) [1], usually caused by excessive quick, monotonous, repetitive eccentric contractions and gripping activities of the wrist.[2, 3]

Lateral epicondylitis patients excessive overload to ECRB muscle, combined with the disadvantage leverage system caused by sloping the lateral epicondyle,creates a fulcrum effect around the prominent radial head and then increased tension of the soft issues in that area, particularly when the forearm is working in the hyperpronated position.

Proposed mechanism for pain in chronic lateral epicondylitis cited by **Mulligan (1995)** is that a minor positional fault of joint may occur following an injury or strain, resulting in movement restriction or pain.**Lewit (1985)** has shown that, reduced joint mobility can often be a result of reflex muscle splinting. It is suggested that treatment directed at the joint will have an effect on muscle activity and vice-versa. **Paungmali A (2003)** concluded that MWM using belt for chronic lateral epicondylitis is capable of producing concurrent hypoalgesic effects during and following MWM application as well as altering physiological effects. **Vicenzino** demonstrated beneficial effects of applying MWM using belt technique on the pain and dysfunction that is classically associated with chronic lateral epicondylitis. They concluded that improvement in function, and reduction in pain level.

The Mobilisation with Movement (MWM) using belt had been proved for its effects in reducing pain and improving functional activity in chronic lateral epicondylitis. During the mobilisation the adhesions are broken, within tenoosseus junction, there by relieving pain and increase extensibility at the affected area.

Therapeutic Eccentric Exercise (TEE) program introduced in this study proved to be an effective method of treating chronic lateral epicondylitis. All outcome measures for chronic lateral epicondylitis were markedly improved with the Therapeutic Eccentric Extensor exercise (TEE), compared with Mobilisation with Movement (MWM) using belt.This novel exercise, using an FlexBar, provides a practical means of adding isolated eccentric training for ECRB, which was chronically inflamed. Therapeutic eccentric exercise (TEE) was performed using a rubber bar (Thera-Band FlexBar) which was twisted using wrist flexion of the uninvolved limb and slowly allowed to untwist with eccentric wrist extension by the involved limb.

Each eccentric wrist extensor contraction lasted approximately 4 seconds (i.e., slow release). Both upper extremities were reset for the subsequent repetitions. A 30-second rest period was timed between each set of 15 repetitions and 3 sets of 15 repetitions were performed daily. Intensity was increased by giving the patient a thicker rubber bar if the patient reported no longer experiencing discomfort during the exercise. The additional benefit of this treatment is, it can be performed as part of a home program and does not involve continued medical supervision. It is a self therapy and cost effective.This is to improve the collagen alignment, tissue healing in spite of some evidence that the therapeutic levels of eccentric exercise may increase collagen synthesis. It produces positive results when applied during later stages of healing.

Therapeutic Eccentric Exercise (TEE) increases the force being transmitted to tendons and bones, which will maintain and generally increase the strength and functional capacity of the structures.

SUMMARY AND CONCLUSION

11. SUMMARY AND CONCLUSION

To compare the effect of Mobilisation with Movement (MWM) using belt and Therapeutic Eccentric Exercise (TEE) in chronic lateral epicondylitis, a sample of thirty subjects were randomly divided into two groups of fifteen each. Group A were given Mobilisation with Movement (MWM) using belt. Group B Subjects were given only Therapeutic Eccentric Exercise (TEE).

The parameters used to assess outcome in both the groups were pain, and Patient Rated Elbow evaluation Questionnaire (PREEQ). Pain and functional activity were measured using Visual Analogue Scale and Patient Rated Elbow evaluation Questionnaire (PREEQ) respectively. The post test values measured at the end of six weeks and the pre-test values analyzed statically using paired‘t’ test and independent ‘t’ test .The tests revealed that there was significant improvement in both groups .But Therapeutic eccentric exercise (TEE) had greater improvement than Mobilisation with Movement (MWM) using belt in the two outcome measures. So this study shows that the Therapeutic Eccentric Exercise (TEE) is more effective in lateral epicondylitis.

This study concludes that, both Movement with Mobilisation (MWM) Using Belt and Therapeutic eccentric exercise Technique is equally effective for reducing pain, but Therapeutic Eccentric Exercise (TEE) found to be very effective in improving the functional activity.

LIMITATIONS AND SUGGESTIONS

12. LIMITATIONS AND SUGGESTIONS

The present study has some limitations

a) The number of subjects included in this study is only fifteen per group. The validity of the results can be enhanced by repeating the study with large number of participants.

b) The term effects of these interventions and the incidence of recurrence of the condition can be studied by adequate follow-up.

c) Inclusion of a Mobilisation with Movement (MWM) using belt patients using medications would not be helpful in validating the results.

d) Therapeutic Eccentric Exercise (TEE) with varies tension tubing should be incorporated in order to get more desired effects in muscle strength.

e) Patients with bilateral lateral epicondylitis should also include for further studies.

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APPENDIX

14. APPENDIX

DATA COLLECTION-I

GROUP A - MOVEMENT WITH MOBILIZATION USING BELT

S. No.	VAS		PREEQ	
	PRE	POST	PRE	POST
1	65	48	58	39
2	72	49	67	47
3	63	42	55	38
4	72	52	57	42
5	61	42	64	52
6	67	44	58	41
7	61	38	62	35
8	70	33	66	45
9	68	41	61	42
10	71	35	73	52
11	69	55	68	41
12	64	46	65	42
13	66	38	69	45
14	64	43	65	44
15	67	44	67	46

GROUP B-THERAPEUTIC ECCENTRIC EXERCISE

S. No.	VAS		PREEQ	
	PRE	POST	PRE	POST
1	66	45	64	40
2	62	49	60	35
3	70	42	68	39
4	66	45	57	30
5	61	41	60	40
6	65	42	68	40
7	62	39	66	35
8	65	46	59	35
9	60	40	63	39
10	63	41	58	35
11	71	49	56	32
12	67	43	65	42
13	64	41	62	39
14	66	40	67	34
15	65	38	69	32

APPENDIX-II

PATIENT ASSESSMENT CHART

Age :

Sex :

Occupation :

Address :

Date of assessment :

Chief complaints :

PATIENT HISTORY

Mode of work :

Recreational Mode activities :

Pain history

Onset :

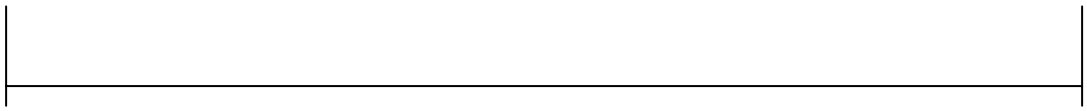
Site :

Side :

Nature :

Intensity :

Visual analogue scale



0 100

No pain worst pain

Aggravating factors :

Relieving factors :

Use of medications : Yes/No

If yes, details :

On palpation

Warmth :

Tenderness :

On examination

Range of motion Right Left

Shoulder :

Elbow :

Forearm :

Wrist :

Resisted isometrics

Wrist extensors : Painful/Painless Strong/Weak

Wrist flexors : Painful/Painless Strong /Weak

Forearm supinators : Painful/Painless Strong/Weak

Forearm pronators : Painful/Painless Strong/Weak

Functional Assessment : PREEQ Score

Special Tests

Mill’s Test +ve -ve

Cozen’s Test +ve -ve

PROVISIONAL DIAGNOSIS:

APPENDIX-III

2.1. VISUAL ANALOGUE SCALE:

Visual analogue scale is used to assess the level of pain as described by melzack and wall. The measurement is from ‘’0-100”

0-Represents no pain, 100- represents worse pain.

0 100

No pain worst pain

2.2. PATIENT RATED ELBOW EVALUATION QUESTIONARRIE (PREEQ)

NAME……. **DATE…….**

PAIN SCALE:

1	When it is at its worst	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
2	at rest	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
3	When lifting a heavy object	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
4	When doing a task with repeated elbow movement	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
5	How often do you have pain?	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable

FUNCTIONAL SCALE:

SPECIFIC ACTIVITIES

1	Comb my hair	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
2	Eat with a fork or spoon	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
3	Pull a heavy object	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
4	Use my arm to rise from a chair	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
5	Carry a 10lb object with my arm at my side	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
6	Throw a small object, such a tennis ball	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
7	Use a telephone	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
8	Do up buttons on the front of my shirt	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
9	Wash my opposite armpit	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
10	Tie my shoe	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
11	Turn the doorknob and open a door	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable

USUAL ACTIVITIES

1	Personal care activities (dressing, washing)	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
2	Household work (cleaning, maintenance)	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
3	Work (your job or everyday work)	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable
4	Recreational activities	No pain 0 1 2 3 4 5 6 7 8 9 10 worst pain imaginable

Functional score= **Total score=**

The PREEQ is a 20-item questionnaire designed to measure elbow pain and disability in activities of daily living. The PREEQ allows patients to rate their levels of elbow pain and disability from 0 to 10, and consists of 2 subscales.

1) PAIN subscale (o=no pain, 10 worst ever)

Pain - 5 items

Pain score=sum of the pain 5 items (out of 50)-best score=0, worst score=50

2) FUNCTION subscale (0=no difficulty, 10=unable to do)

Specific activities -11 items

Usual activities -4 items

Function score = sum of the function items, divided by 3(out of 50) - Best score=0, worst score=50

Total score= sum of pain+ function scores - Best score=0, worst score=100.

The total PREE score rates pain and disability equally. Higher score indicates more pain and functional disability.

APPENDIX-IV

CONSENT TO PARTICIPATE IN THE STUDY

I .....voluntarily consent to participate in the research study. **‘’EFFECT OF MOBILISATION WITH MOVEMENT USING BELT VERSUS THERAPEUTIC ECCENTRIC EXERCISE TRAINING FOR REDUCING PAIN AND IMPROVING FUNCTIONAL ACTIVITY IN CHRONIC LATERAL EPICONDYLITIS PATIENTS’’. -COMPARATIVE STUDY.**

The researcher has explained to me the treatment approach in brief, the risk of participation, and answered the questions related to the research to my satisfaction.

Participant signature

Signature of witness